

however. In this study, hatching was concentrated from mid-May to mid-June (Table 1).

For all years combined, 54% of the young hatched in May, 45% in June, and 1% in July. Zwickel and Bendell (1967) noted peak hatching lasted approximately two weeks on Vancouver Island, and the period of maximum hatching (> 70%) took place within three to four weeks; they found that 67% of the young hatched during the peak, 7% before, and 26% after the peak. For northeastern Oregon the peak of hatching (55% of the young) occurred from 20 May to 2 June (Table 2); 9% hatched before the peak and 36% after.

Maximum hatching of young (71%) took place from 18 May to 7 June. Median hatching date for the five years was 31 May and the mean was 1 June. Dates of peak hatching of Blue Grouse in northeastern Oregon (Table 2) were from two to four weeks earlier than those reported for British Columbia, Alberta, Montana, and Arizona (Bendell 1955, Mussehl 1960, Boag 1965, Zwickel and Bendell 1967, Brown and Smith 1980, Zwickel, personal communication) and one week earlier than hatching in northern California and northern Nevada (Zwickel, personal communication). Hatching dates were similar to those reported in north central Washington (Standing 1960, Henderson 1960, Bauer 1962, Zwickel 1973) and Idaho (Caswell) 1954.

Factors affecting the timing of reproductive activities of Blue Grouse throughout their range are incompletely understood. King (1971) found that hatching times were related to elevation; Blue Grouse in subalpine areas hatched approximately 3.5 weeks later than those living at lower elevations. Marshall (1946) proposed that plant phenology in spring influenced the timing of migration of Blue Grouse, which in turn affected breeding times. Plant phenology also may directly influence breeding times (Zwickel, personal communication). Plant phenology throughout the range of Blue Grouse is strongly influenced by elevation and latitude. Blue Grouse populations with which our data were compared (Table 2), except for birds in north central Washington and western Idaho, inhabited areas either farther north by > 4° (British Columbia and Alberta) or at higher elevations ( $\geq 1800$  m in Montana and Arizona), which may account for earlier breeding in northeastern Oregon. The study site in Washington was

approximately 3° north of our area but was lower in elevation (450–900 m) and the study area of Caswell (1954) in Idaho bordered northeastern Oregon.

Zwickel (1977) noted that temperature and precipitation partially accounted for annual differences in hatching chronology within populations; earlier hatching coincided with warm, dry conditions during April and May. Redfield (1975) suggested that annual differences within populations were related to spring temperatures. In our study the median hatching date in 1984 was from 6 to 10 days later than in any of the other four years. Comparisons of median hatching dates with mean monthly temperature and total monthly precipitation during March, April, and May reveal that precipitation during April/May (10.7 cm) and from March through May (15.4 cm) 1984 was the highest of the five years; mean values for the other four years were 9.2 cm and 13.4 cm, respectively. Temperature data for 1984 were similar to the other four years. No other trends were apparent from these data, and limited sample size (five years) precluded statistical testing.

We concluded that hatching times of Blue Grouse in northeastern Oregon were similar in most years. Mean hatching date differed only in 1984; all dates were within a 10-day interval. Latest hatching corresponded to the wettest spring of the five years. Hatching dates in northeastern Oregon were consistent with the observation of Bendell and Zwickel (1985) of early breeding within the central portion of the range of Blue Grouse.

#### ACKNOWLEDGMENTS

We would like to thank T. F. Haensly and S. M. Meyers for their assistance in determining sex and age of birds. The manuscript was reviewed by F. C. Zwickel, E. C. Meslow, and R. L. Jarvis. Special appreciation is expressed to F. C. Zwickel for generously sharing unpublished data. This is Technical Publication 7838 of the Oregon Agricultural Experiment Station.

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# NEW SOUTH AMERICAN LEAFHOPPERS IN THE GENUS *DOCALIDIA*, WITH A KEY TO 37 SPECIES (CICADELLIDAE: COELIDIINAE, TERULIINI)

M. W. Nielson<sup>1</sup>

**ABSTRACT.**—Ten new species of *Docalidia* are described and illustrated. These are *pennyi*, *gracilitas*, *zanoli*, *triquetra*, *paracrista*, *convexa*, *setacea*, and *caterva* from Brazil and *vesica* and *vella* from Peru. A key to males of 37 species described since the last revision of the genus is included. The number of known species is now 116, making *Docalidia* the largest teruliine genus.

Since the treatment of the genus *Docalidia* in a revision of the tribe Teruliini (Nielson 1979), several new species in the genus have been described (Nielson 1982a, 1982b, 1982c). In this paper 10 additional new species are described and illustrated, bringing the total to 116 known species in this the largest of the teruliine genera.

The richness of the fauna of this group in South America (only one species known in Central America and one in the West Indies) is staggering. The number of known species prior to 1979 was 21 and since then the number has increased nearly 600%. Most of the new species described herein and in earlier papers were the result of collections made during the last 20 years. As new areas of tropical America become more accessible and collections more extensive, many new species of *Docalidia* will be found.

Docalidiine leafhoppers are small to medium-sized, robust species with short, broad heads. The crown is short, broad, depressed, but usually not carinate, and the pronotum is noticeably inflated in many species. A very well-developed median clypeal carina distinguishes this group from other similar appearing genera that usually have a weakly developed clypeal carina. The long, usually slender, aedeagus with or without a single subapical ventral spine, simple to ornate style and 10th segment processes, and the broad plate will readily distinguish the group from all other teruliine genera.

A key to males of 37 species not previously keyed is given to accommodate species described here and in my three earlier papers

cited above. The remainder are keyed in my 1979 paper.

Hosts and biology of these leafhoppers are poorly known. Paucity of populations accounts for the lack of knowledge of their biometrics and importance to agriculture and silviculture in the tropics of the new world.

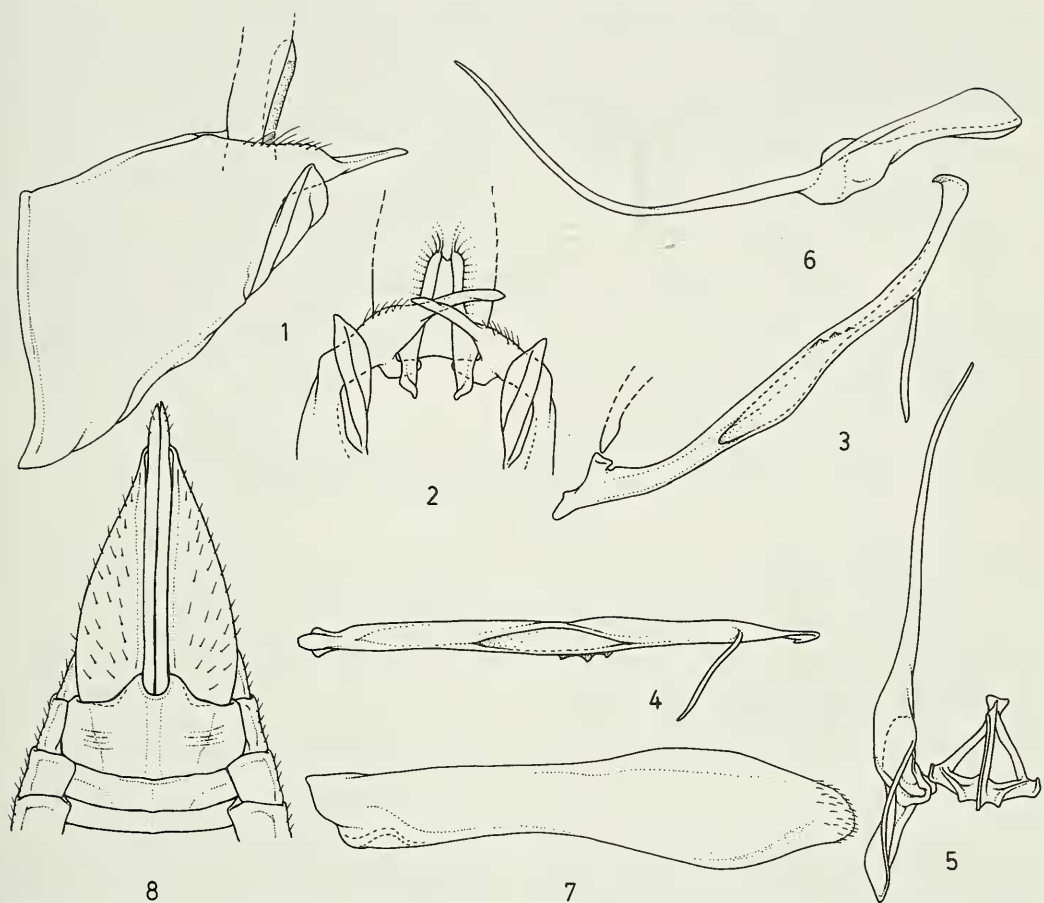
## Key to Males of *Docalidia*

1. Style simple, without spines or setae . . . . . 2
- Style ornate, with spines and/or setae present . . . . . 6
- 2(1). Style filamentous in distal half . . . . . 3
- Style broad in distal half . . . . . 4
- 3(2). Pygofer with small caudoventral lobe (Fig. 1); aedeagus with subapical spine (Fig. 3) . . . . . *caterva*, n. sp.
- Pygofer with very long broad caudoventral process (Fig. 19, Nielson 1982b); aedeagus without subapical spine (Fig. 23, Nielson 1982b) . . . . . *exilis* Nielson
- 4(2). Aedeagus with subapical spine; pygofer with caudodorsal process bifurcate or rounded distally . . . . . 5
- Aedeagus without subapical spine (Fig. 83, Nielson 1982a); pygofer with caudodorsal process single and pointed (Fig. 79, Nielson 1982a) . . . . . *glabra* Nielson
- 5(4). Pygofer with caudoventral process very long and lobelike, apex rounded (Fig. 1, Nielson 1982a) . . . . . *lobata* Nielson
- Pygofer with caudoventral process short, narrow, curved mesally and pointed apically (Fig. 31, Nielson 1982a) . . . . . *hansoni* Nielson
- 6(1). Style with 1–3 spines in distal half to third . . . . . 7
- Style with numerous spines and/or setae in distal half to third . . . . . 9
- 7(6). Aedeagus with subapical spine (Fig. 17, Nielson 1982a); style with single, terminal spine (Fig. 14, Nielson 1982a) . . . . . *nuda* Nielson

<sup>1</sup>Monte L. Bean Life Science Museum, Brigham Young University, Provo, Utah 84602.

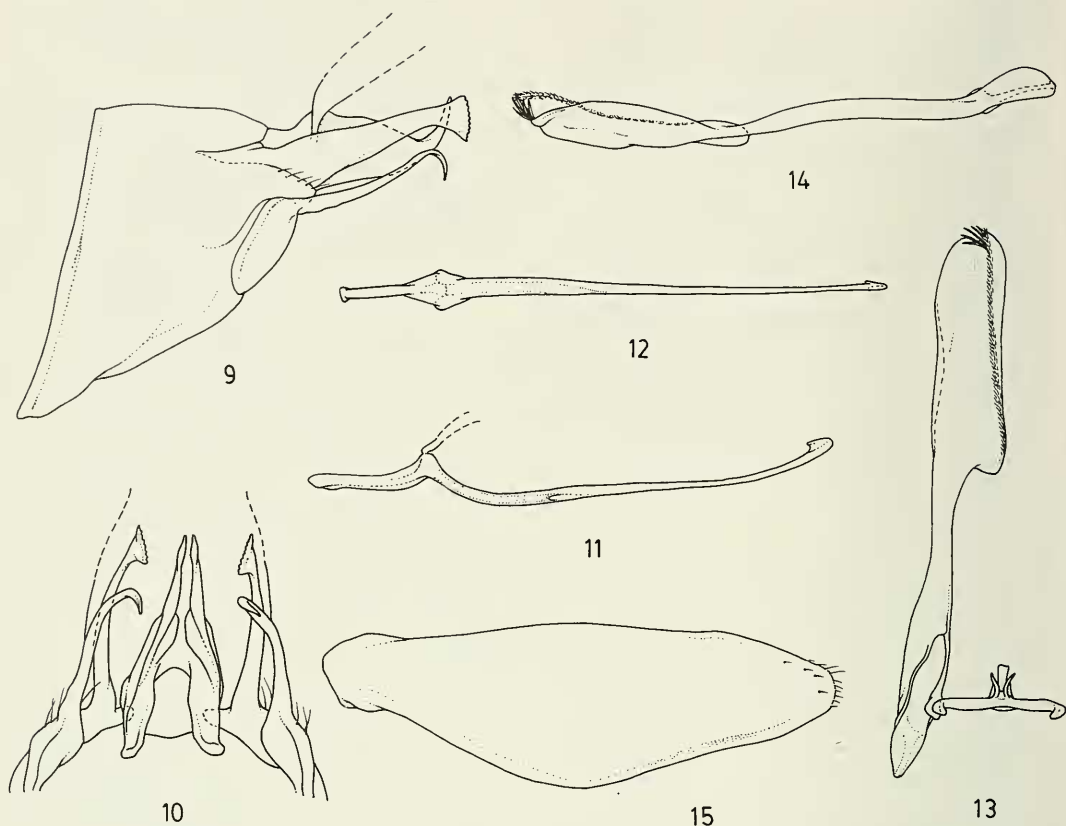


- Aedeagus without subapical spine; style with lateral spines. . . . . 8
- 8(7). Pygofer with long caudoventral process (Fig. 37, Nielson 1982b); style with long subapical spine directed distally (Fig. 38, Nielson 1982b) . . . . . *hawsi* Nielson
- Pygofer without such process (Fig. 49, Nielson 1982b); style with long spine medially and two short subapical spines directed laterally (Fig. 50, Nielson 1982b) *tuberculata* Nielson
- 9(6). Pygofer with distinctive long caudoventral process . . . . . 10
- Pygofer without such process (small lobe often present). . . . . 22
- 10(9). Segment 10 without well-developed, ornamental ventral processes (often much reduced but apparent). . . . . 11
- Segment 10 with well-developed, ornamental ventral processes . . . . . 12
- 11(10). Aedeagus with subapical spine (Fig. 64, Nielson 1982a), style with spines in distal half (Fig. 62, Nielson 1982a) . . . . . *paragracilis* Nielson
- Aedeagus without such spine (Fig. 35, Nielson 1982b); style with spines in distal third . . . . . *crista* Nielson
- 12(9). Style with spines or setae . . . . . 13
- Style with spines and setae combined . . . . . 21
- 13(12). Style with spines only, not densely packed . . 14
- Style with setae only, densely packed appearing as velvet (Fig. 13). . . . . *vella*, n. sp.
- 14(13). Style with one to two large medial spines (or near middle) and numerous shorter spines below in distal half . . . . . 15
- Style without medial spines, numerous spines in distal third . . . . . 18
- 15(14). Style with shaft narrow in distal half. . . . . 16
- Style with shaft expanded in distal third (Fig. 20) . . . . . *zanoli*, n. sp.
- 16(15). Style with spines below medial spine(s) long and on inner lateral margin . . . . . 17
- Style with spines below medial spine very short (spiculated) and on dorsal margin (Fig. 74, Nielson 1982a) . . . . . *corneola* Nielson
- 17(16). Segment 10 with very long ventral processes (Fig. 55, Nielson 1982a); style with single medial spine (Fig. 57, Nielson 1982a) . . . . . *dorsti* Nielson
- Segment 10 with short ventral processes (Fig. 67, Nielson 1982a); style with two medial spines (Fig. 68, Nielson 1982a) . . . . . *bispinata* Nielson
- 18(14). Pygofer with distally enlarged, caudally truncate, caudodorsal process . . . . . 19
- Pygofer with bladelike caudodorsal process . . 20
- 19(18). Pygofer with caudodorsal process with teeth in dorsal half (Fig. 7, Nielson 1982c); style with large teeth on inner lateral margin and without vesica in distal third (Fig. 8, Nielson 1982c) . . . . . *multidentata* Nielson
- Pygofer with caudodorsal process with fine serrations on caudal margin (Fig. 23); style with fine teeth or serrations on inner lateral margin and with large bladder or vesica in distal one-eighth (Fig. 27) . . . . . *vesica*, n. sp.
- 20(18). Pygofer with caudal processes close together (Fig. 30); style with long spines near dorsal margin (Fig. 34) . . . . . *pennyi*, n. sp.
- Pygofer with caudal processes widely separated (Fig. 25, Nielson 1982a); style with short serrations on inner lateral margin (Fig. 26, Nielson 1982a) . . . . . *taylori* Nielson
- 21(12). Segment 10 with long ventral process extending beyond segment 10 (Fig. 1, Nielson 1982c); plate long and narrow (Fig. 6, Nielson 1982c) . . . . . *breddini* Nielson
- Segment 10 with short ventral process with short, bluntly pointed, subapical secondary process (Fig. 7, Nielson 1982a); plate long and broad (Fig. 12, Nielson 1982a) . . . . . *robertsi* Nielson
- 22(9). Aedeagus with very short, subapical ventral spine or spine absent . . . . . 23
- Aedeagus with long, subapical ventral spine. . 27
- 23(22). Aedeagus with ventral spine not more than three times as long as wide . . . . . 24
- Aedeagus with ventral spine absent . . . . . 26
- 24(23). Segment 10 with well-developed ventral processes; style with 1–2 prominent lateral spines on middle of inner lateral margin . . . 25
- Segment 10 with poorly developed ventral processes (Fig. 19, Nielson 1982a); style without such spines (Fig. 20, Nielson 1982a) . . . . . *patula* Nielson
- 25(24). Segment 10 with long ventral process nearly reaching to apex of segment 10, process terminating with short blunt point (Fig. 1, Nielson 1982b); style with two medial spines before dentate inner margin below (Fig. 2, Nielson 1982b) . . . . . *rema* Nielson
- Segment 10 with shorter ventral process, process reaching to middle of segment 10, process narrowed at distal half and curved dorsally (Fig. 37); style with one medial spine before dentate inner margin below (Fig. 41) . . . . . *triquetra*, n. sp.
- 26(23). Style with spines and setae on distal one-fifth, spines on inner lateral margin, setae arranged in one large tuft dorsally (Fig. 26, Nielson 1982b) . . . . . *thola* Nielson
- Style with setae only on distal third, setae on inner and outer lateral margins (Fig. 44, Nielson 1982b) . . . . . *bipenicula* Nielson
- 27(22). Style with distal half to third with one to two prominent spines and with lateral setae on margins . . . . . 28
- Style with distal half to third with lateral setae only or with lateral spines only on margins . . 32
- 28(27). Segment 10 with poorly developed ventral processes; pygofer with straight or nearly straight caudodorsal processes . . . . . 29



Figs. 1–8. *Docalidia caterva*, n. sp.: 1, Male pygofer and segment 10, lateral view. 2, Segment 10 and pygofer processes, ventral view. 3, Aedeagus, lateral view. 4, Aedeagus, ventral view. 5, Connective and right style, dorsal view. 6, Style, lateral view. 7, Plate, ventral view. 8, Female venter, ventral view.

- Segment 10 with large well-developed ventral process (Fig. 7, Nielson 1982b); pygofer with caudodorsal process decurved apically (Fig. 7, Nielson 1982b) ..... *unca* Nielson
- 29(28). Style with setae occupying distal half, setae long and mostly stout ..... 30
- Style with setae occupying distal third, setae short and fine ..... 31
- 30(29). Style with prominent medial lobe on inner lateral margin (Fig. 48), aedeagus with broad shaft (Fig. 47) ..... *setacea*, n. sp.
- Style without such lobe (Fig. 55), aedeagus with narrow shaft (Fig. 54) ..... *gracilitas*, n. sp.
- 31(29). Style narrow throughout with short, stout spine subapically in dorsal view (Fig. 38, Nielson 1982a) ..... *digitata* Nielson
- Style triangulate in distal third with long narrow spine distad of middle in lateral view (Fig. 51, Nielson 1982a) ..... *hirsuta* Nielson
- 32(27). Style with spines only ..... 33
- Style with setae only ..... 34
- 33(32). Style with convex lobe medially on inner lateral margin, spines confined to medial lobe (Fig. 64) ..... *convexa*, n. sp.
- Style not as above, spines occupying entire distal third (Fig. 74) ..... *paracrista*, n. sp.
- 34(32). Style with distal half narrowed throughout .. 35
- Style with distal half to third broadly expanded ..... 36
- 35(34). Style with setae on inner lateral margin from distal three-fourths to apex (Fig. 44, Nielson 1982a) ..... *permagna* Nielson
- Style with setae on dorsal margin basal of apex (Fig. 19, Nielson 1982c) ..... *subcrista* Nielson
- 36(34). Style with distal half expanded (Fig. 14, Nielson 1982c); segment 10 without ventral process (Fig. 13, Nielson 1982c) ... *lateralis* Nielson
- Style with distal third expanded, triangulate (Fig. 14, Nielson 1982b); segment 10 with short ventral process (Fig. 13, Nielson 1982b) ..... *triangulata* Nielson



Figs. 9–15. *Docalidia vella*, n. sp.: 9, Male pygofer and segment 10, lateral view. 10, Segment 10 and pygofer processes, ventral view. 11, Aedeagus, lateral view. 12, Aedeagus, ventral view. 13, Connective and right style, dorsal view. 14, Style, lateral view. 15, Plate, ventral view.

*Docalidia caterva*, n. sp.

Figs. 1–8

LENGTH.—Male, 5.30 mm, female, 6.40 mm.

Small, robust species. General color black with two narrow, broken, pale, ochraceous transverse bands on forewings (wider in female) and numerous pale to ochre spots on veins and cells, apex pale to ochraceous; crown ochre; eyes reddish brown; pronotum and scutellum black in male, brown in female; face black in male, light brown in female.

Head large, broad, nearly as wide as pronotum; crown short, narrow, much narrower than width of eyes, depressed, lateral margin convergent basally; eyes large, elongate ovoid; pronotum short, slightly longer than crown, inflated; scutellum large, much longer than pronotum, inflated anteriorly; forewings

long and broad; clypeus narrow, median clypeal carina well developed; clypellus narrow, lateral margins flared distally.

MALE.—Pygofer in lateral view with very small caudoventral lobe, caudodorsal margin with long narrow process (Figs. 1, 2); segment 10 without ventral processes (Figs. 1, 2); aedeagus asymmetrical, long, nearly tubular, broadly curved in lateral view, with long subapical spine on lateroventral margin and toothed medially on one side of dorsolateral margin (Figs. 3, 4); gonopore very large on lateroventral margin (Fig. 4); style long, very narrow and needlelike in distal half, reaching to about middle of aedeagal shaft (Figs. 5, 6); plate long, narrow, slightly constricted medially, enlarged subapically, and narrowed distally to rounded apex (Fig. 7).

FEMALE.—Seventh sternum large, about two to three times as long as preceding seg-



ment, caudal margin produced at middle, with shallow narrow concavity medially and short blunt projection on either side of middle (Fig. 8).

HOLOTYPE (male).—BRAZIL: Am. [Amazonas], Manaus, INPA, I.V.1976, E. Castellan B. (MZUSP). Allotype female, same data as holotype, except 28.IV.1976 (MZUSP).

REMARKS.—This species is similar in general habitus to *limpidosparsa* (Stal) but is easily separated by the very small caudoventral lobe on the pygofer, by the needlelike style, and by the dentations on the aedeagal shaft.

*Docalidia vella*, n. sp.

Figs. 9–15

LENGTH.—Male, 6.40 mm.

Small, robust species. General color black except for pale anterior area of crown and narrow, ochre apical margin of forewings.

Head short, broad, much narrower than pronotum; crown broad, about as wide as eye, lateral margins parallel except convergent near base; pronotum short, about as long as crown, inflated; scutellum large, median length greater than median length of pronotum; forewing long and broad; clypeus long and broad; median clypeal carina well developed; clypellus narrow; lateral margins nearly parallel.

MALE.—Pygofer in lateral view with long, narrow, apically decurved caudoventral process (Figs. 9, 10); caudodorsal margin with process as in *vesica* (Fig. 9); segment 10 with ventral processes as in *vesica* (Figs. 9, 10, 23); aedeagus asymmetrical; configuration as in *vesica* except without subapical spine (Figs. 11, 12, 25); style long, nearly as long as aedeagus, basal half narrow, distal half very broad, inner dorsal margin lobed distally, with longitudinal fold along entire inner lateral margin in distal half, this margin densely covered with very short setae giving an appearance of velvet, apex with few weak membranous spines (Figs. 13, 14); plate long and very broad, apex with short macrosetae (Fig. 15).

FEMALE.—Unknown.

HOLOTYPE (male).—PERU: Madre de Dios, Rio Tambopata Res., 30 air km SW Pto. Maldonado, 290 m, subtropical moist forest, 11–15.XI.1979, J. W. Heppner (USNM).

REMARKS.—This species is similar in gen-

eral habitus and some male genital characters to *vesica* but can be distinguished by the absence of the subapical aedeagal spine and by the velvetlike inner lateral margin in the enlarged distal half of the style.

*Docalidia zanoli*, n. sp.

Figs. 16–22

LENGTH.—Male, 6.75 mm.

Small robust species. General color dark brown with broad, nearly complete, transverse translucent band on middle of forewings, veins black with pale spots; crown pale; eyes light brown; pronotum and scutellum black with bullae on pronotum pale; face black.

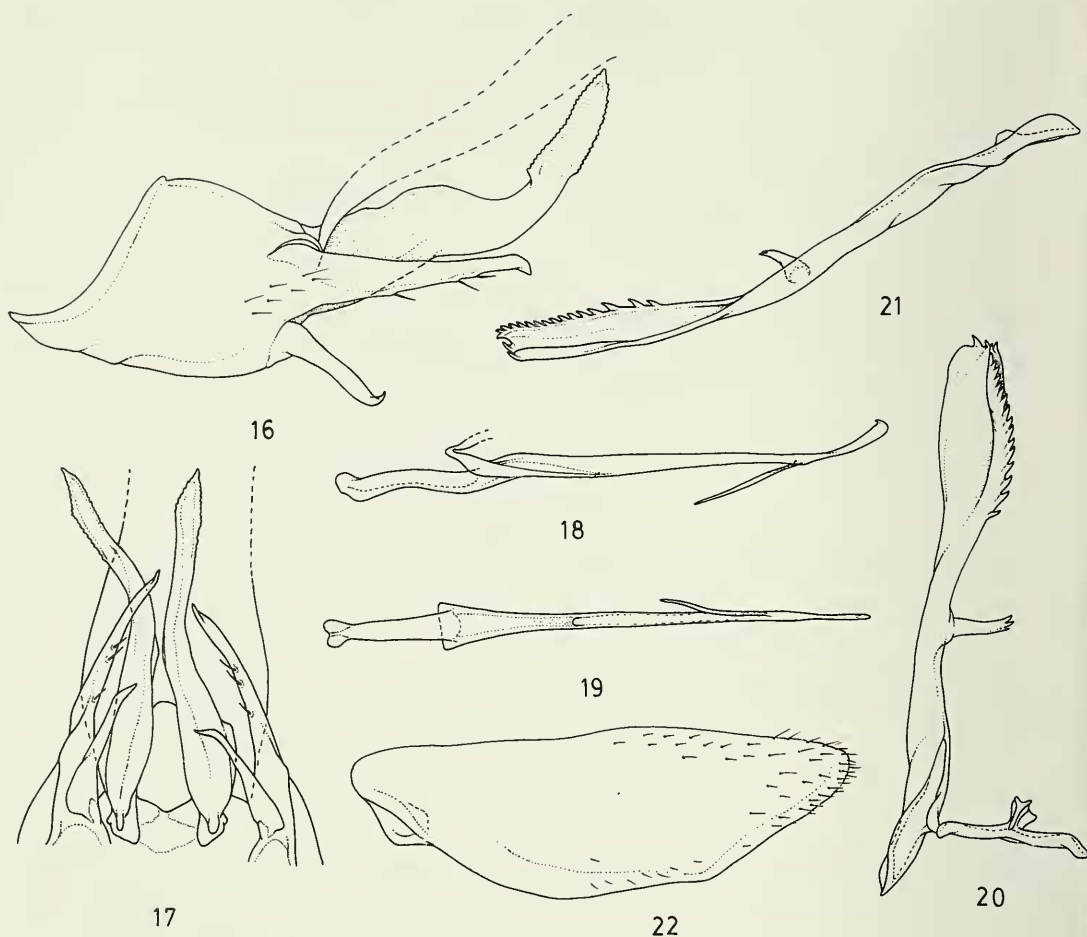
Head short, very broad, slightly narrower than pronotum; crown broad about as wide as eye, depressed, lateral margins as in *gracilitas*; eyes large, semiglobular; pronotum and scutellum as in *gracilitas* except more deeply marked; forewing long and broad; clypeus and clypellus configuration as in *gracilitas*.

MALE.—Pygofer in lateral view with long, narrow, distally curved caudoventral process and with long, narrow caudodorsal process, caudodorsal process longer than caudoventral process (Figs. 16, 17); segment 10 with ventral process very large, broad at basal half, narrowed at distal half, curved caudodorsally and extending to apex of segment 10 (Figs. 16, 17); aedeagus asymmetrical, long, narrow along dorsal margin, broad along ventral margin, slightly curved throughout in lateral view with long, narrow subapical spine on ventral margin (Figs. 18, 19); gonopore basad of middle on ventral margin; style long, reaching to about apex of aedeagus, with medial process on inner lateral margin, process asymmetrically toothed distally, distal third of style expanded, with inner lateral margin serrated and submarginally sclerotized, apex rounded with apical teeth (Figs. 20, 21); plate long and broad, tapered toward bluntly rounded apex (Fig. 22).

FEMALE.—Unknown.

HOLOTYPE (male).—BRAZIL: Cruzeiro do Sul, ACRE, \_\_\_\_\_.II.1963, M. Alvarenga (UFP).

REMARKS.—This species is similar in male genital characters to *dentatula* (Metcalf), but it can easily be separated by the presence of a



Figs. 16-22. *Docalidia zanoli*, n. sp.: 16, Male pygofer and segment 10, lateral view. 17, Segment 10 and pygofer processes, ventral view. 18, Aedeagus, lateral view. 19, Aedeagus, ventral view. 20, Connective and right style, dorsal view. 21, Style, lateral view. 22, Plate, ventral view.

long medial process on the inner lateral margin of the style. I name this species for Ketí Mariá Rocha Zanol, Universidade Federal Do Parana, who has kindly sent me material for study and who is working on the Deltocephalinae of Brazil.

*Docalidia vesica*, n. sp.

Figs. 23-29

LENGTH.—Male, 6.40 mm.

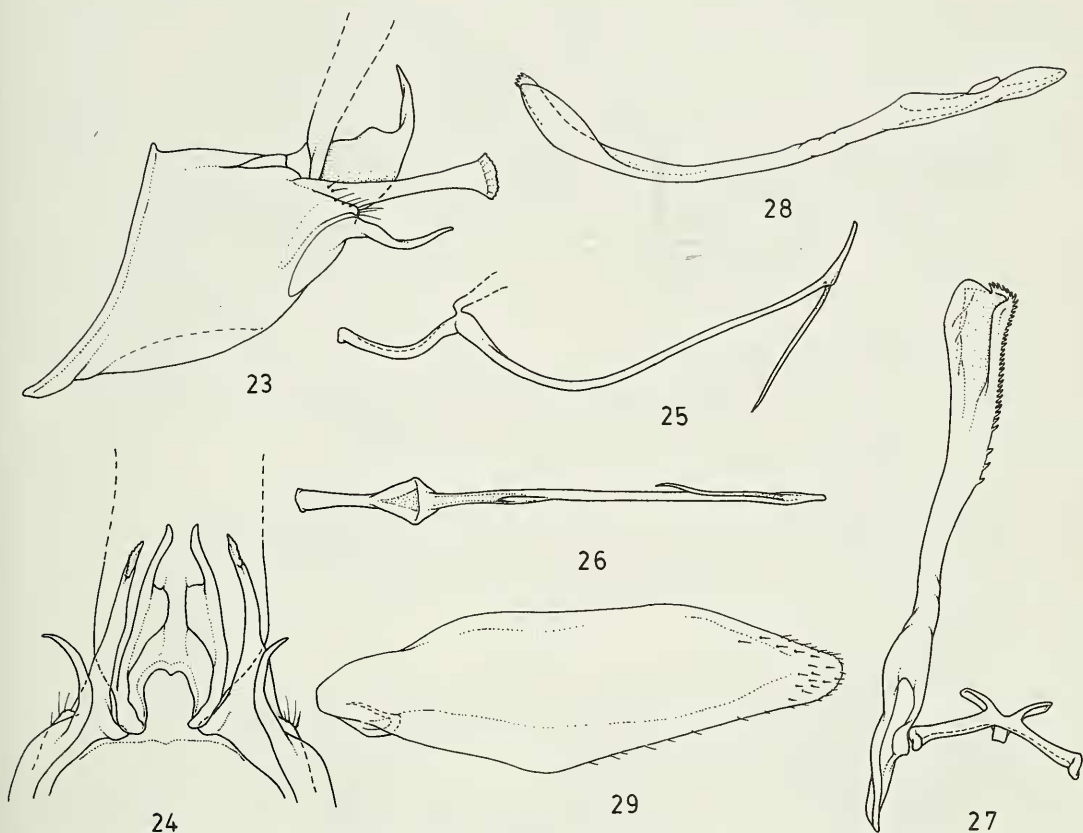
Medium-sized, robust species. General color black throughout with narrow ochraceous band distally on forewings.

Head short, broad, much narrower than pronotum; crown short, broad, about as wide as eye, depressed on either side of middle,

lateral margins parallel except convergent basally; pronotum short, about as long as crown, slightly inflated; scutellum large, median length greater than median length of pronotum; forewing long and broad; clypeus long and broad, median clypeal carina well developed; clypellus narrow, lateral margins slightly expanded distally.

MALE.—Pygofer in lateral view with long, very narrow, sinuate caudoventral process, caudodorsal margin with long, rather stout process, process enlarged distally, caudal margin subtruncate and finely serrate (Figs. 23, 24); segment 10 with well-developed ventral processes, process very broad in basal half, with narrow projection curved dorsally (Figs. 23, 24); aedeagus asymmetrical, long





Figs. 23–29. *Docalidia vesica*, n. sp.: 23, Male pygofer and segment 10, lateral view. 24, Segment 10 and pygofer processes, ventral view. 25, Aedeagus, lateral view. 26, Aedeagus, ventral view. 27, Connective and right style, dorsal view. 28, Style, lateral view. 29, Plate, ventral view.

and nearly needlelike throughout, broadly curved in lateral view, with long subapical spine on ventral margin (Figs. 25, 26); gonopore basad of middle on lateral margin; style very long, extending beyond apex of aedeagus, broad throughout except for constriction along middle, finely toothed in distal third of inner lateral margin and with large, saclike membranous bladder dorsally in distal one-eighth (Figs. 27, 28); plate long and very broad with microsetae distally (Fig. 29).

FEMALE.—Unknown.

HOLOTYPE (male).—PERU: Monson Valley, Tingo Maria, 8.X.1954, E. L. Schlinger and E. S. Ross (CAS).

REMARKS.—*Docalidia vesica* has similar style to *patula* Nielson and similar aedeagus and segment 10 processes to *unca* Nielson but can be distinguished from both species by the long, stout caudodorsal process of the pygofer, which is enlarged distally and trun-

cate and serrate on caudal margin, and by the long sinuate caudoventral pygofer process. It lacks the spines on the middle of the inner margin of style in *unca* and has a much longer subapical aedeagal spine than *patula*.

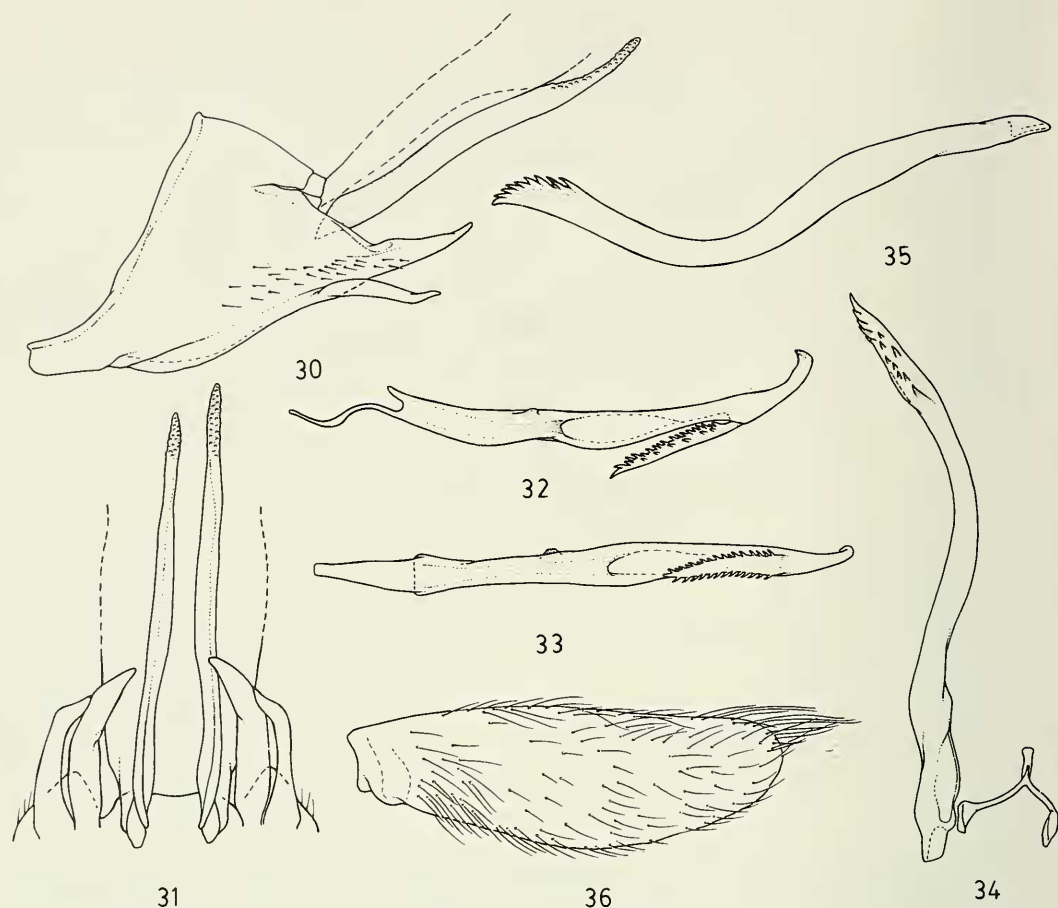
#### *Docalidia pennyi*, n. sp.

Figs. 30–36

LENGTH.—Male, 7.75 mm.

Large, robust species. General color brown. Crown deep tan with dark markings; eyes reddish brown; pronotum and scutellum black; forewing brown with broad, deep tan transverse band near middle and along apex.

Head short and very broad, narrower than pronotum; crown short, slightly exceeding anterior margin of eyes, broad, about as wide as eyes; pronotum and scutellum large; forewing broad; clypeus broad with well-



Figs. 30–36. *Docalidia pennyi*, n. sp.: 30, Male pygofer and segment 10, lateral view. 31, Segment 10 and pygofer processes, ventral view. 32, Aedeagus, lateral view. 33, Aedeagus, ventral view. 34, Connective and right style, dorsal view. 35, Style, lateral view. 36, Plate, ventral view.

veloped median longitudinal carina; clypellus narrow, lateral margins expanded distally.

MALE.—Pygofer in lateral view with two long bladelike processes close together on caudodorsal margin, ventral process narrower (Fig. 30); segment 10 with pair of very long, narrow ventral processes that extend beyond apex of segment 10, minutely dentate on dorsal margin and at apex (Figs. 30, 31); aedeagus asymmetrical, long, with longitudinal trough medially on ventral margin, apex curved dorsally in lateral view and with moderately long subapical ventral spine directed basally, spine dentate; gonopore medial on ventral margin (Figs. 32, 33); style very long, nearly reaching apex of aedeagus, narrow, broadly sinuate in lateral view, with numerous spines near dorsal margin on distal one-fourth (Figs. 34, 35); plate long and broad, with numerous, long,

microsetae along inner margin and at apex (Fig. 36).

FEMALE.—Unknown.

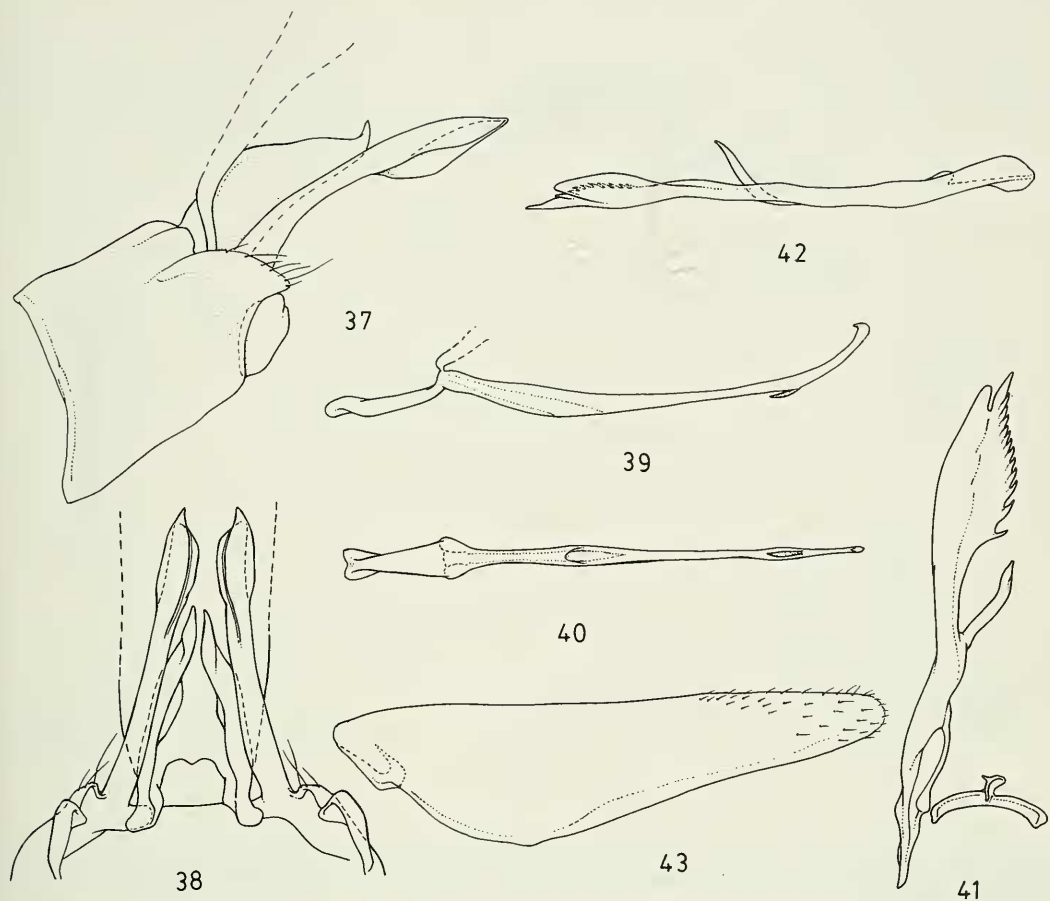
HOLOTYPE (male).—BRAZIL: LeBrea, Amazonas, 27.V.1963. Antonio Carqueira, 2518 (MZUSP).

REMARKS.—This species is near *dentatula* (Metcalf) and can be distinguished by the narrow style with numerous spines on its distal third. I take pleasure in naming this species for Dr. Norman D. Penny, California Academy of Sciences, who has collected several new species of coelidiine leafhoppers described in this and other papers.

*Docalidia triquetra*, n. sp.

Figs. 37–43

LENGTH.—Male, 6.15 mm.



Figs. 37–43. *Docalidia triquetra*, n. sp.: 37, Male pygofer and segment 10, lateral view. 38, Segment 10 and pygofer processes, ventral view. 39, Aedeagus, lateral view. 40, Aedeagus, ventral view. 41, Connective and right style, dorsal view. 42, Style, lateral view. 43, Plate, ventral view.

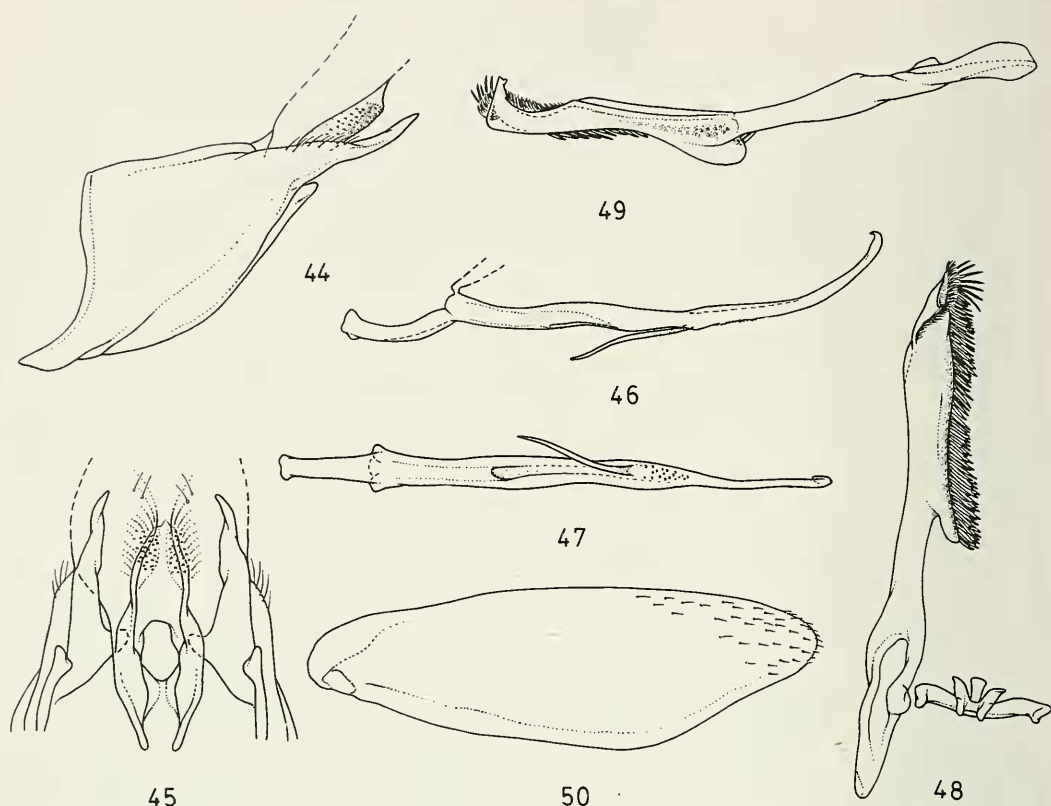
Small, robust species. General color brown with large, triangular ochre area on middle of forewing; crown pale; eyes reddish brown; pronotum black with ochraceous bullae; scutellum black; veins of forewings with ochre spots; face dark brown.

Head short and very broad, narrower than pronotum; crown short and wide, nearly as wide as eyes, depressed, lateral margins convergent basally; eyes large, semiglobular; pronotum short, about as long medially as crown; scutellum large, median length greater than median length of pronotum; forewing long and broad; clypellus long and broad, with prominent median longitudinal carina; clypellus narrow, lateral margins parallel except for expansion distally.

MALE.—Pygofer in lateral view with very long process on caudodorsal margin, process

reaching apex of segment 10, asymmetrically flanged laterally on distal third of ventral margin (Figs. 37, 38); segment 10 with short, basally broad ventral process, process gradually narrowed toward apex, apex curved dorsally to a blunt point (Figs. 37, 38); aedeagus slightly asymmetrical, long, very narrow, compressed laterally at distal two-thirds, broadly curved in lateral view, with very small spine subapically on ventral margin (Figs. 39, 40); gonopore basad of middle on ventral margin; style very long, nearly reaching to apex of aedeagus, ornate at distal half with long lateral process on middle of inner margin, process directed distally and curved dorsally at distal half, distal third of style subtriangular, with lateral teeth on inner margin from base to apex, apex clefted medially, inner part sharply pointed and sclerotized, outer part





Figs. 44–50. *Docalidia setacea*, n. sp.: 44, Male pygofer and segment 10, lateral view. 45, Segment 10 and pygofer processes, ventral view. 46, Aedeagus, lateral view. 47, Aedeagus, ventral view. 48, Connective and right style, dorsal view. 49, Style, lateral view. 50, Plate, ventral view.

narrowly rounded and translucent (Figs. 41, 42); plate long and broad with short, microsetae distally (Fig. 43).

FEMALE.—Unknown.

HOLOTYPE (male).—BRAZIL: Ro [Rondonia], Porto Velho, 11.IX.1965, Epitacio, DPTO Zool., UF Parana (UFP).

REMARKS.—This species is similar to *ferriplena* (Walker) in male genital characters but can be distinguished by the flanged caudodorsal process of the pygofer and by the distal third of the style, which is clefted apically with inner side sharply pointed and outer one rounded.

*Docalidia setacea*, n. sp.

Figs. 44–50

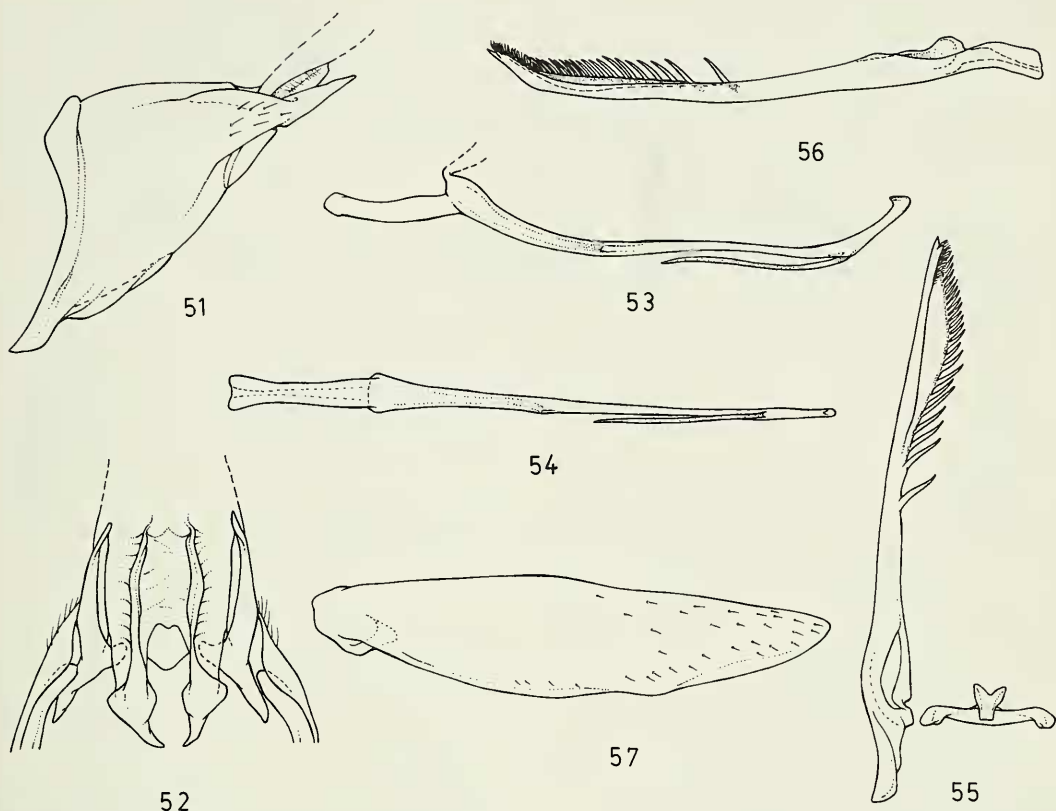
LENGTH.—Male, 8.10–8.30 mm.

Large, robust species. General color deep tan to dark brown throughout; pronotum and

scutellum black with numerous small tannish spots; veins of forewings with small suffused spots; face brown to blackish.

Head short, very broad, narrower than pronotum; crown short, broad, about as wide as eye, disk depressed in either side of middle, lateral margins parallel except convergent basally; pronotum short, little longer medially than crown; pronotum large, length greater than length of pronotum; forewing long and broad; clypeus long, narrow, median clypeal carina well developed; clypellus narrow, lateral margins broad distally.

MALE.—Pygofer in lateral view with very small caudoventral lobe, caudodorsal margin with long, narrow process (Fig. 44); segment 10 with poorly developed ventral process (Figs. 44, 45); aedeagus asymmetrical, long, slightly curved dorsally at distal fourth in lateral view, flanged medially on dorsal margin in dorsal view, with long, very narrow ventral spine on middle of shaft (Figs. 46, 47);



Figs. 51–57. *Docalidia gracilitas*, n. sp.: 51, Male pygofer and segment 10, lateral view. 52, Segment 10 and pygofer processes, ventral view. 53, Aedeagus, lateral view. 54, Aedeagus, ventral view. 55, Connective and right style, dorsal view. 56, Style, lateral view. 57, Plate, ventral view.

gonopore basad of middle on ventral margin; style long, not reaching apex of aedeagus, ornate at distal half, inner lateral margin with broad, distally rounded lobe on middle, directed anterio-mesally, with numerous stout setae on inner lateral margin from lobe to subapex of style, apex with narrow, blunt spine directed laterally in lateral view and covered with long microsetae (Figs. 48, 49); plate long and very broad, with few microsetae on distal third (Fig. 50).

FEMALE.—Unknown.

HOLOTYPE (male).—BRAZIL: Rondonia, Porto Velho, 1.VI.1979, J. Campbell (MZUSP). Paratype. One male, same data as holotype except 15.III.1979, D. Need (author's collection).

REMARKS.—*Docalidia setacea* is similar to *multispiculata* Nielson in setal pattern and arrangement on the style but can be distinguished by the presence of a broad process on the middle of the inner margin of the style, by

the narrow, blunt spine apically on the style and by the narrower aedeagus.

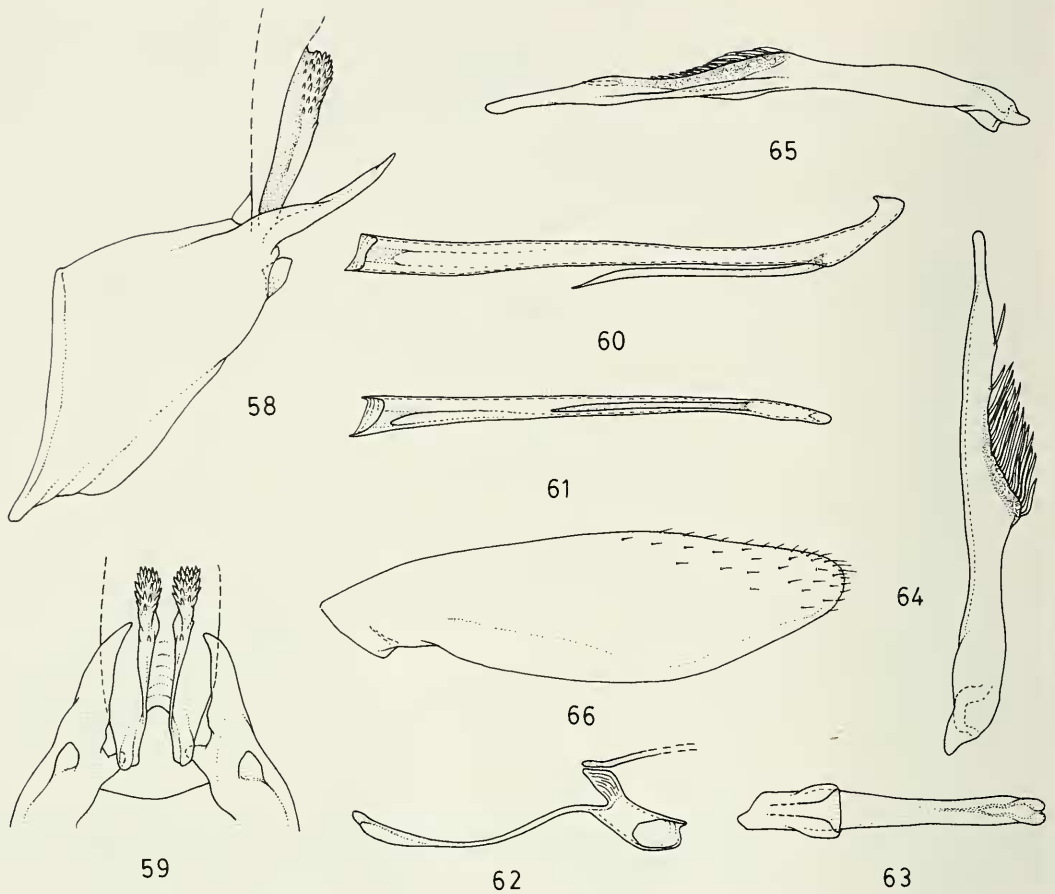
### *Docalidia gracilitas*, n. sp.

Figs. 51–57

LENGTH.—Male, 7.20 mm, female, 7.30–7.50 mm.

Moderate-sized, robust species. General color light brown; pronotum and scutellum dark brown; eyes reddish brown; face brown with black markings.

Head short and very broad, slightly narrower than pronotum, broadly rounded anteriorly; crown short, broad, about as wide as eye, depressed, lateral margins sinuate and converging basally; eyes large, semiglobular; pronotum about as long as crown; scutellum large, median length greater than median length of pronotum; forewing long and broad; clypeus long and broad with prominent me-



Figs. 58–66. *Docalidia convexa*, n. sp.: 58, Male pygofer and segment 10, lateral view. 59, Segment 10 and pygofer processes, ventral view. 60, Aedeagus, distal portion, lateral view. 61, Aedeagus, distal portion, ventral view. 62, Aedeagus, basal portion, lateral view. 63, Aedeagus, basal portion, ventral view. 64, Style, dorsal view. 65, Style, lateral view. 66, Plate, ventral view.

dian longitudinal carina; clypellus narrow, lateral margins sinuate.

**MALE.**—Pygofer in lateral view with small, narrow caudoventral lobe, caudodorsal margin produced to long, attenuated process (Fig. 51); segment 10 long and narrow with short, inconspicuous ventral lobe (Fig. 51, 52); aedeagus long, very narrow throughout, somewhat compressed laterally, broadly curved in lateral view, with long, very slender, subapical process (Figs. 53, 54); gonopore basad of middle on lateral margin; style long, narrowed medially, expanded at distal half on inner lateral margin on dorsal view, with row of setae from middle of inner margin to apex, setae longer, larger, and wider apart at middle, becoming shorter, narrower, and closer together toward apex, apex

with a short, sharp spine (Figs. 55, 56); plate long and broad as in *gracilis* Nielson, with some short microsetae near apex (Fig. 57).

**FEMALE.**—Seventh sternum large, about three times as long as preceding segment, caudal margin sinuate, lateral margins with submarginal trough.

**HOLOTYPE** (male).—BRAZIL: Mn. Am. 10.II.1967, Varios 2526 (MZUSP). Allotype female, Amazonas, Manaus, INPA, 30.XII.1977, A. Soares (MZUSP). Paratype, one female, same data as allotype, except 14.V.1979, J. Arias (author's collection).

**REMARKS.**—From *gracilis*, to which it is similar in male genital characters, *gracilitas* can be distinguished by the narrow caudoventral lobe of the pygofer, by the row of spines on the style that are restricted to the inner